



A CLASSIFICATION METHOD FOR THE SEDIMENT THICKNESS OF SALT PONDS BASED ON SENTINEL-2 DATA

YiBo Zhang¹, Qiang Yin^{1*}, Fei Ma¹ Wen Hong²,

¹College of Information Science and Technology, Beijing University of Chemical Technology, Beijing, P.R. China 100029.

²Aerospace Information Research Institute Chinese Academy of Sciences, Beijing, P.R. China 100029.

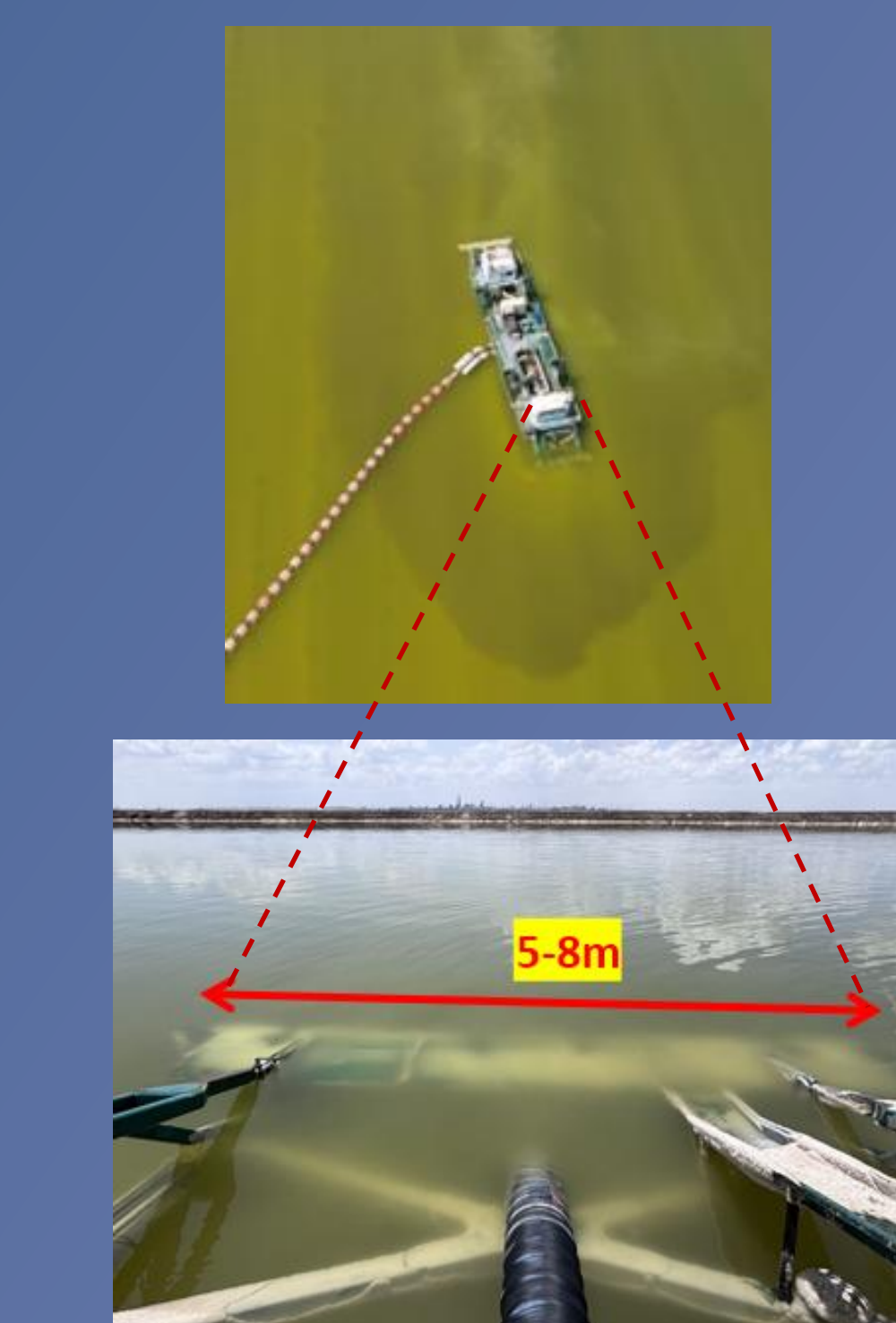
yingq@buct.edu.cn



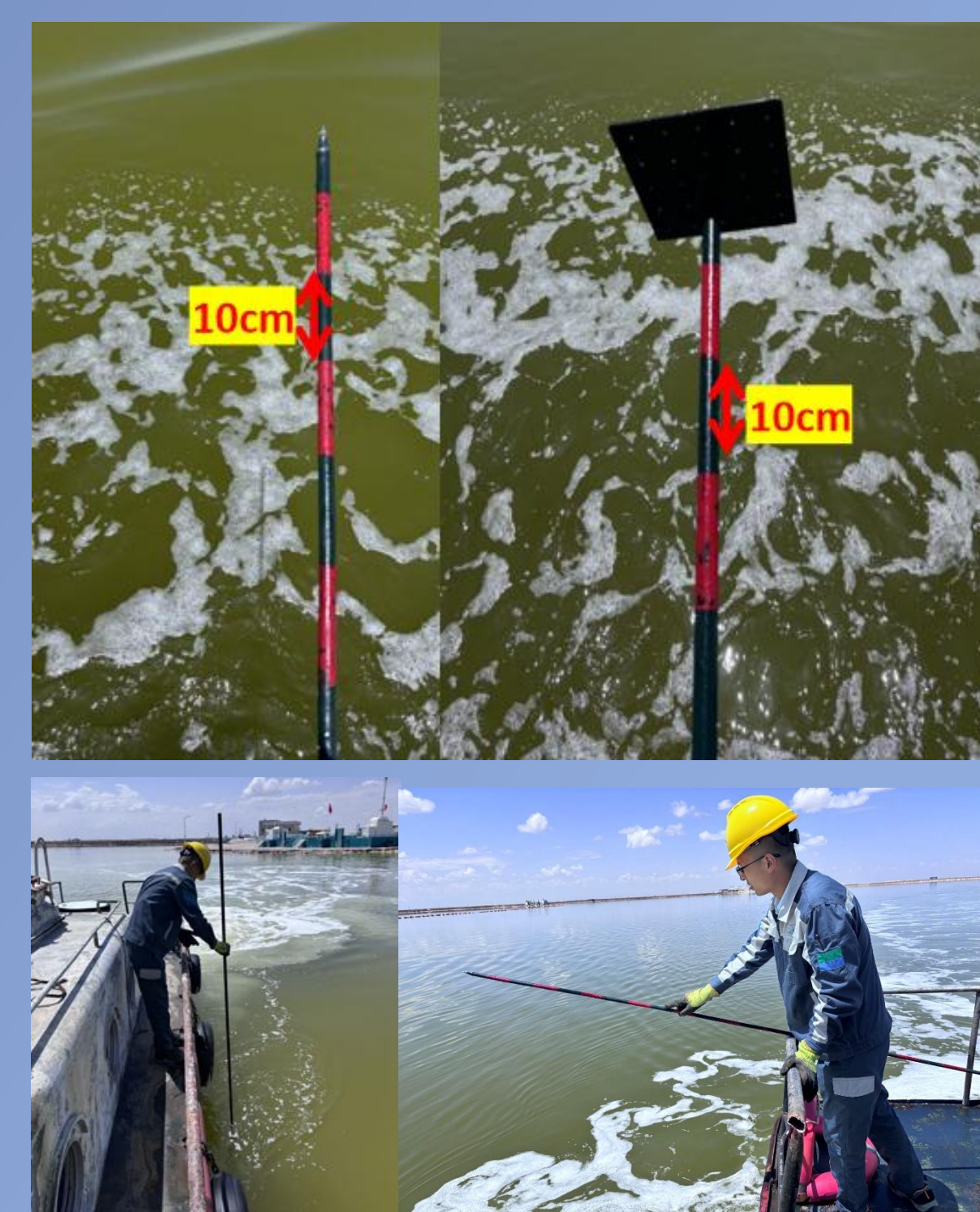
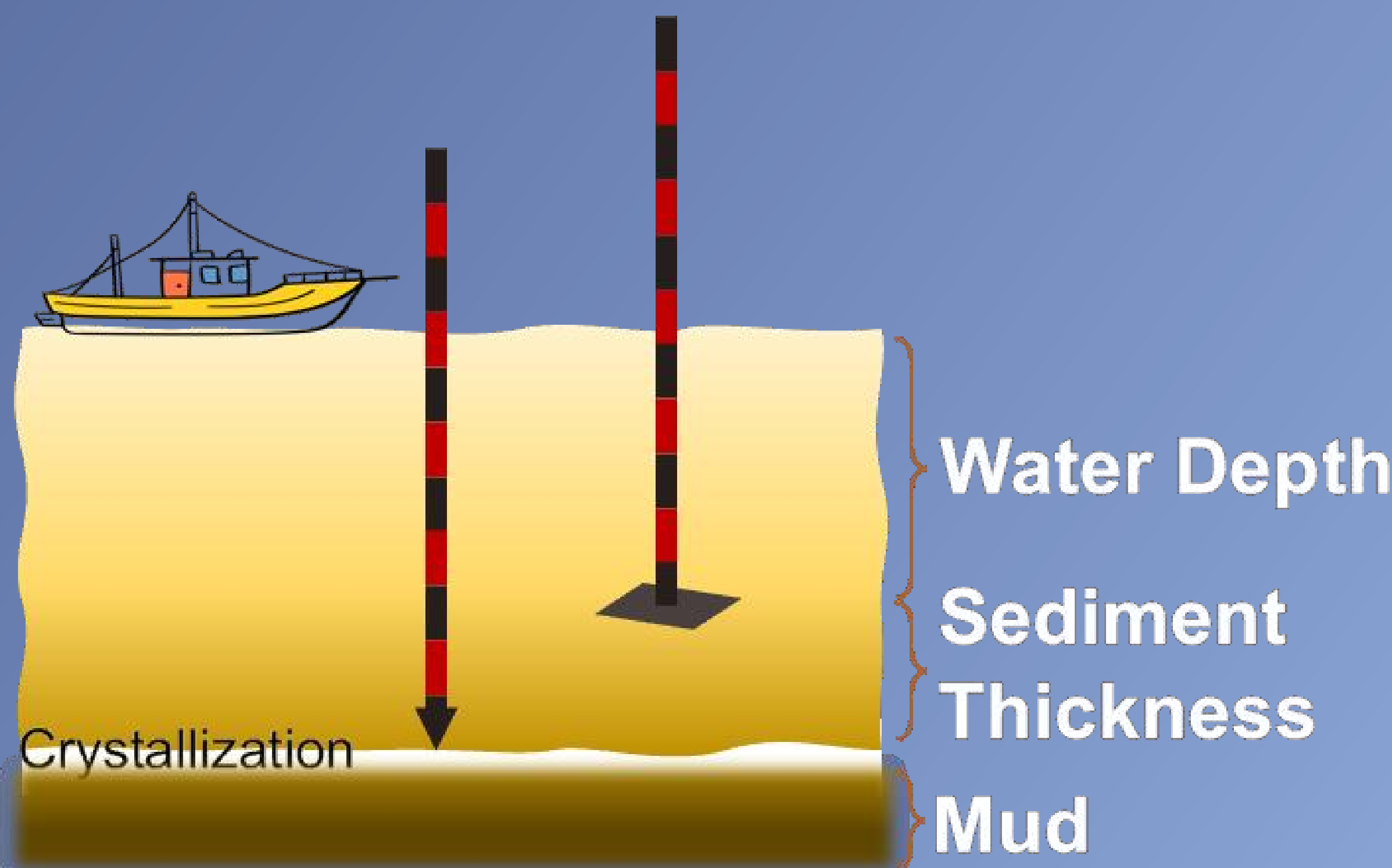
ABSTRACT

Optical remote sensing has shown excellent performance in water body monitoring, but its application in resource-rich salt lakes—especially for monitoring key production areas like carnallite ponds—remains limited. To address this gap, this study explores the fine classification of sediment thickness in carnallite ponds using Sentinel-2 multispectral imagery. Four sedimentation levels were labeled based on actual mining conditions. A novel line-target recognition approach based on attention mechanisms is proposed to exploit the linear working patterns of resource extraction. By combining empirical features and structured information, a classification model sensitive to linear targets is constructed. Experimental results show effective differentiation of carnallite sediment thickness, with preliminary validation through field investigations.

MINING METHOD



SEDIMENT THICKNESS MEASUREMENT METHOD

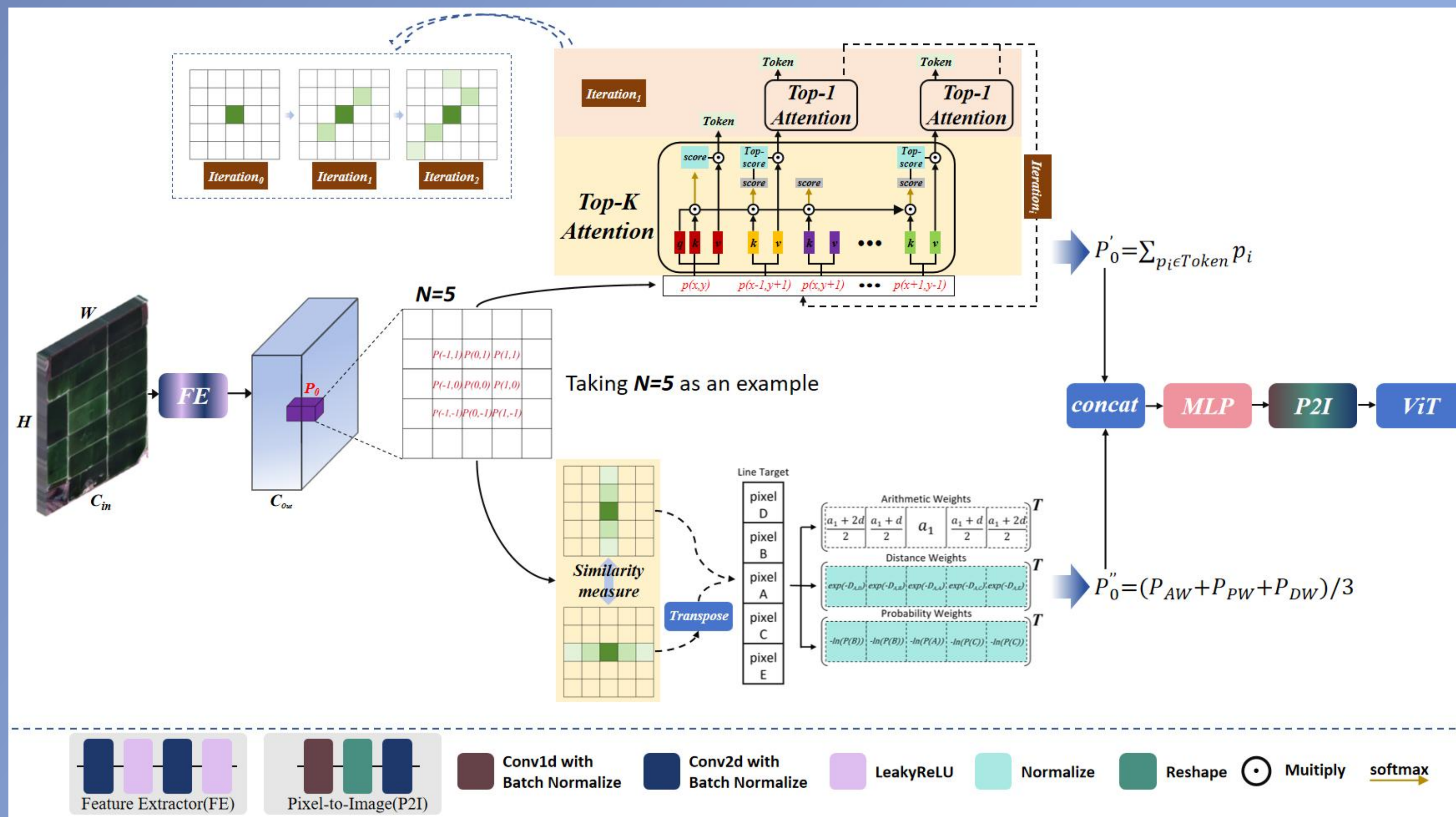


CLASSIFICATION METHODS

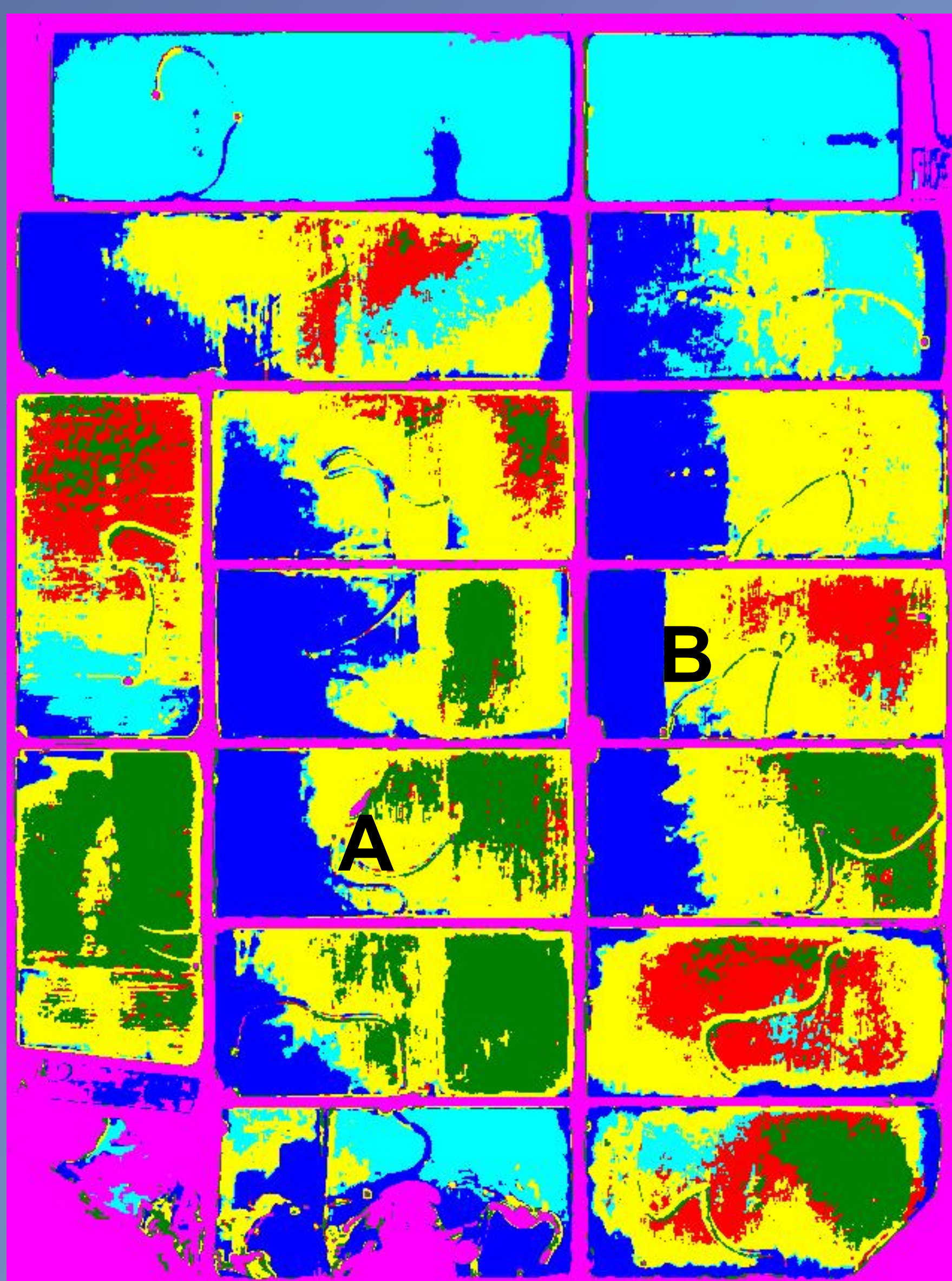
Qarhan Salt Lake, Qinghai Province, China

Sentinel-2B MSI 10 m (for RGB and NIR bands)

Acquisition & Labeling Date: 2025.06.09



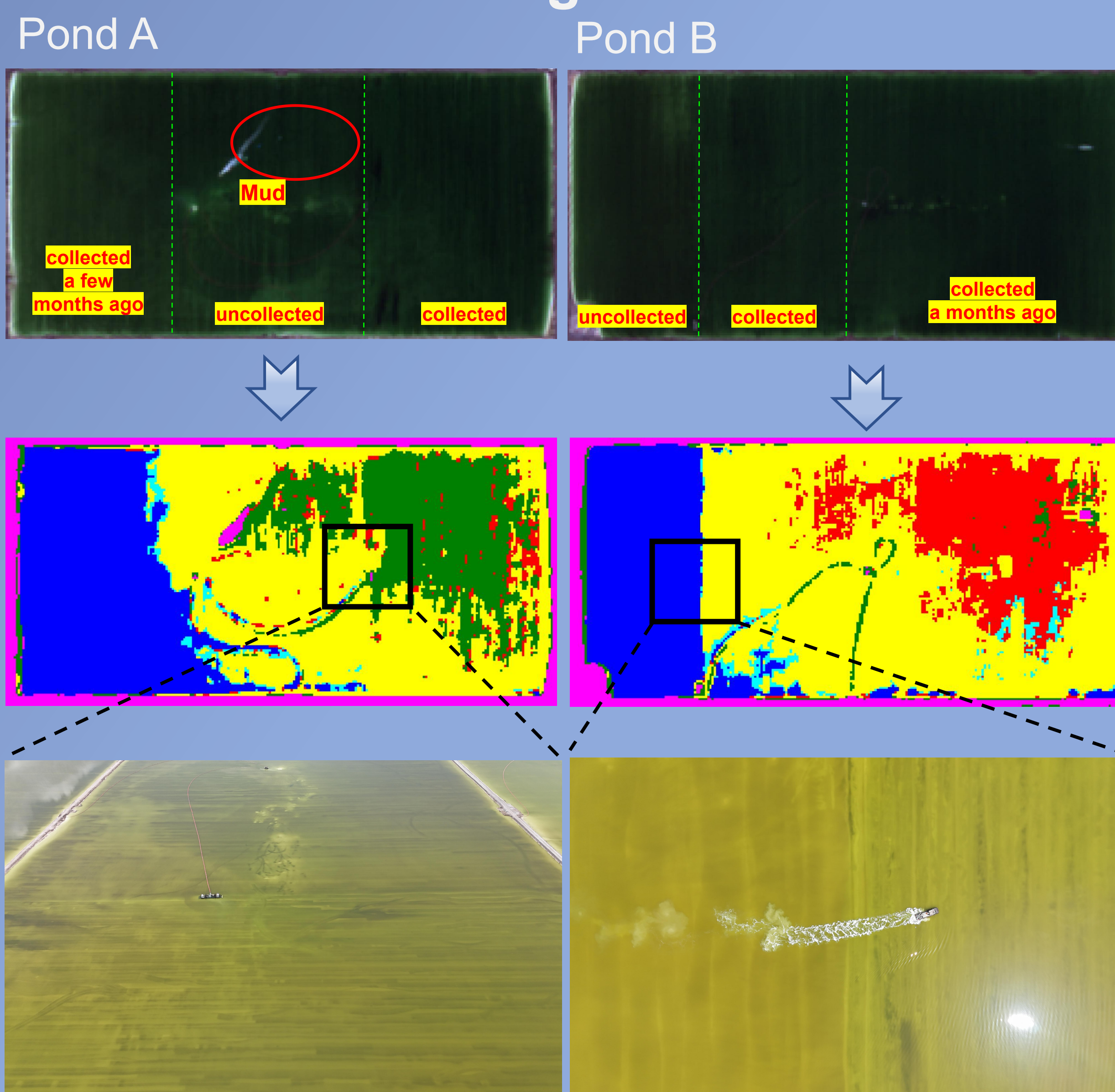
Classification Results



<7 cm
7-12 cm
12-17 cm
>17 cm
Buffer Pond
Other



Field Investigation Results



Ablation Study

metrics	Accuracy	Kappa	Recall	F1-score
model				
ResNet18	0.8217	0.7914	0.8365	0.8281
line target+ ResNet18	0.8789	0.8520	0.8991	0.8905
ViT-b-16	0.8642	0.8381	0.8772	0.8801
line target+ ViT-b-16	0.8913	0.8675	0.9127	0.9012



CONCLUSIONS

Based on field investigations and expert evaluation in the domain, the proposed method achieved satisfactory classification results for sediment thickness in carnallite ponds. Compared with conventional classification networks, the model demonstrates enhanced sensitivity to linear targets, aligning well with the operational patterns of salt pond mining.